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COMMONWEALTH OF AUSTRALIA
PATENT SPECIFICATION

23, 295/56.

Complete Specification Lodged 4th November, 1957.
Application Lodged(No.23, 295/56)..... 19th November, 1956.

Applicant (Actual Inventor)..... Clarence Henry Lines.

Complete Specification Published 8th May, 1958.
Complete Specification Accepted 22nd August, 1958.

Classification 85. 6; 85. 7.

Drawing attached.

COMPLETE SPECIFICATION.

"IMPROVEMENTS RELATING TO DRILL HEADS FOR AUGERS AND
THE LIKE."

The following statement is a full description of this invention, including the best method of performing the same:-

This invention relates to the drill heads attached to the end of augers and like boring members used for example in post hole borers or diggers and is principally directed to multi cutter heads used for boring in rock and very hard ground.

The principal object of this invention is to provide an improved multi cutter drill head to accurately bore the diameter of holes required by maintaining the drill head in substantially constant axial penetration, and consistently clearing or withdrawing the drilled earth or material from the hole.

By the constant removal of the earth, rock, dust and the like, a clean hole is preserved to facilitate the continuous descent of the drill head and auger and the stabilisation of the latter in an axial path within the hole.

With the above stated objective in view there is provided according to this invention a multi cutter drill head comprising a discal or cylindrical head to be attached to the auger and having in the top a number of complementary apertures uniformly spaced sym-

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metrically about the axis of the drill head, one side or portion of the apertures defining with the periphery of the head an equivalent number of earth receiving surfaces merging into downwardly inclined slant surfaces defining the inner end or portion of the apertures in projecting towards the axis at an indication to the latter, and at least one cutter mounted upon each slant surface to cut an annular path.

Conveniently there may also be provided an axially projecting centre drill set in a boss upon the underside of the discal or cylindrical head, and one or more sizing cutters may be attached to the latter to define the diameter of the hole.

The discal or cylindrical head fitting the hole cut by the sizing and multi cutters stabilises the drill head and the auger within the hole to maintain the drill in the required axial penetration.

The slant surfaces being disposed over and in advance of the sets of cutters pick up the drilled earth, rock, dust and the like, which is forced up said surfaces onto the upper earth receiving surfaces to be withdrawn upon the upstroke or withdrawal of the auger.

The accompanying drawings depict a practical arrangement of the multi cutter drill head according to this invention.

In these drawings:-

Fig. 1 is a vertical central section of the drill head.

Fig. 2 is an underside plan partly in section taken on the line 3-2 of Fig. 1.

Fig. 3 is a section taken on line 3-3 of Fig. 2.

Referring now to Figs. 1 and 2 of the drawings the discal or cylindrical head indicated generally at 5 comprises a shallow cylindrical member 6 having a flat top 7 and a substantially ring shaped body 8, the top 7 having a number of equally spaced apertures 10 having parallel sides 11 and disposed at right angles to each other symmetrically about the inner central boss 12 of the cylindrical head 5. Upon the other side the cylindrical head 5 is formed with an aligning solid boss 13a fitted with diametrical pins 13b for the bayonet coupling of the main auger (not shown).

The above-mentioned apertures 10 with the periphery of the cylindrical ring body 8 define a number of outer flat surfaces 14 constituting the underside of the flat top 7, one side of which surfaces merge into downwardly projecting slant surfaces 16 as illustrated in Fig. 2.

These slant surfaces 15 are formed upon and present upon the underside of the discal head 5 four offset arms 16 inclined to the axis of the drill head and symmetrically disposed relatively to and projecting from the central boss 12 to the inner peripheral wall of the

body 8 of the discal or cylindrical head 5. The arms are attached to the corner of the particular aperture 10, the boss 13 and inner peripheral wall 8a of the cylindrical head 5 as viewed in Fig. 3.

The above slant surfaces 16 of the inclined arms disposed at an opposed inclination to the path of rotation of the drill head, have mounted thereon the tool holders 18 carrying the parallel duplicate cutters indicated generally at 19 arranged to cut separate or overlapping annular paths, and at variable depths, e.g. with eight cutters, four may be disposed to operate at one depth and the other four at a greater or lesser depth as will be apparent from Fig. 1. The multiple cutters 19 are arranged relatively to the boss 12 whereby each cutter commencing from the inner cutter 19a adjacent the boss is at progressively increased distance or out of concentric relation whereby each cutter effects an individual annular cut in the ground.

One of the cutters 19 is disposed outside the periphery of the discal head as illustrated in Fig. 2 to constitute a sizing cutter for the drill head.

As viewed in Fig. 3 the tool holders 18 comprise the plates 18 having a channel shaped flange 23 at the outer end to fit over the edge of the above arms 16 against which the plates 18 seat and are held by one bolt 25.

The cutters 19 have replaceable hardened tips 26 fitted to the angular shoulders 27 of the cutters.

The central boss is threaded to receive a centre drill 29 to complete the drill head.

The multiple cutters 19 operating under the flat top 7 of the discal head 5 upon the walls 16 cut the earth, rock and other material which is picked up by the slant surfaces 16 which deflect the earth and material onto the "flats" 14 to be carried out by the auger when withdrawn from the hole.

The claims defining the invention are as follow:-

1. A multiple cutter drill head comprising a discal or cylindrical head to be attached to the end of the auger and having in the top a number of complementary apertures uniformly spaced symmetrically about the axis of the drill head, one side or portion of the apertures defining with the periphery of the head an equivalent number of earth receiving surfaces merging into downwardly inclined slant surfaces defining the inner end or portion of the apertures in projecting towards the axis at an inclination to the latter, and at least one cutter mounted upon each slant surface to cut an annular

path. (19th November, 1956).

2. A multi cutter drill head according to claim 1 wherein a pair of cutters are mounted upon each slant surface, with each cutter disposed at a relatively different distance or radius from the axis of the discal or cylindrical head. (19th November, 1956).

3. A multiple cutter drill head according to claim 2 wherein an outer cutter of one pair is located externally of the periphery of the discal or cylindrical head. (19th November, 1956).

4. A multi cutter drill head according to any one of claim claims 1 to 3 wherein the slant surfaces comprise uniformly inclined arms projecting between the earth receiving surfaces and a central boss upon the underside of the discal or cylindrical head. (19th November, 1956).

5. A multi cutter drill head according to any one of the preceding claims and having an axial central drill projecting from the central boss. (19th November, 1956).

6. A multiple cutter drill head according to any one of claims 2 to 4 wherein the pairs of cutters are attached to a tool holder detachably mounted upon the slant surfaces. (19th November, 1956).

7. A multi cutter drill head according to any one of the preceding claims wherein the discal or cylindrical head is detachably connected to the auger. (19th November, 1956).

8. A multi cutter drill head of the construction substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings. (19th November, 1956).

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<u>Serial No.</u>	<u>Application No.</u>	<u>Classification.</u>
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